

Gene	11			12			22			F-ratio	p	Gene score
	N	Mean	SD	N	Mean	SD	N	Mean	SD			
Dopamine genes												
DRD1 SNP Ddel												
Lit												
Optimized	39	20.10	10.2	164	17.58	11.1	133	18.30	10.9	0.848	0.43	201
DRD2 SNP Taq IA												
Lit												
Optimized	15	15.93	10.3	120	19.50	10.2	201	17.51	11.4	1.560	0.21	020
DRD3 SNP MscI												
Lit												
Optimized	152	17.68	11.2	157	18.34	11.0	27	19.16	9.6	0.495	0.63	002
DRD4 1 48 bp repeat												
Lit												
Optimized	56	19.00	10.9	162	17.98	10.5	118	17.86	11.6	0.223	0.80	002
DRD5 2 dinucleotide repeat												
Lit												
Optimized	74	18.63	11.4	111	19.15	11.3	151	17.38	10.6	0.881	0.41	120
DRD6 3 repeat												
Lit												
Optimized	21	15.33	12.4	142	17.41	10.9	173	19.07	10.8	1.619	0.20	012
Serotonin genes												
HTT 4 (SLC6A4) promoter ins/del												
Lit												
Optimized	85	16.20	10.9	159	19.11	10.9	91	18.28	11.3	1.953	0.14	022
HTR1A SNP C-1918G												
Ind												
Optimized	82	19.00	10.61	177	17.31	11.4	77	19.89	10.1	1.663	0.19	102
HTR1B (HTR1DB) SNP G861C												
Lit												
Optimized	202	18.49	10.9	107	17.30	11.1	27	19.00	11.5	0.496	0.61	002
HTR1DA SNP T1350C												
Ind												
Optimized	266	18.16	11.3	70	19.34	9.7	5	-	-	0.641	0.43	02-
HTR2A SNP T102C MspI												
Lit												
Optimized	58	17.88	11.2	172	18.59	11.0	106	17.61	11.0	0.279	0.76	012
TDO2 SNP G->A Int 6Bst												
Lit												
Optimized	315	17.98	11.0	17	20.65	10.4	5	-	-	0.951	0.33	02-
TPH SNP A 779 C												
Lit												
Optimized	60	19.00	10.4	180	17.73	10.8	96	19.28	11.5	0.705	0.495	002

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Figure 1(a)
(continued)

Gene	11			12			22			F-ratio	p	Gene score
	N	Mean	SD	N	Mean	SD	N	Mean	SD			
Norepinephrine genes												
DBH SNP Taq I												
Lit												
Optimized	67	18.81	10.1	168	18.78	11.1	101	16.69	11.3	1.285	0.28	220
ADRA2A SNP promoter region MspI												220
Ind	186	17.42	11.1	128	18.8	10.5	22	21.95	11.7	1.96	0.14	012
Optimized												012
ADRA2B del/ins												
Ind	155	18.14	11.5	158	18.46	10.6	23	19.73	9.6	0.215	0.81	102
Optimized												002
ADRA2C * dinucleotide repeat												
Ind	131	18.77	10.5	113	15.79	11.0	92	20.17	11.2	4.45	0.012	202
Optimized												102
NET (SLC6A2) SNP A1970G MvaI												
Ind	155	17.82	11.2	144	19.04	10.6	38	16.6	11.3	0.914	0.402	120
Optimized												120
PWMT SNP G-148A												
Ind	110	16.89	11.1	156	19.59	10.9	66	17.58	10.9	2.05	0.129	012
Optimized												021
COMT SNP val 158 met, G1947A, NlaIII												
Ind	75	19.42	10.8	175	18.52	11.0	86	15.52	10.8	1.55	0.212	210
Optimized												210

Lit, references for literature-based gene scoring; Ind, gene scoring based on our studies of an independent set of subjects; SNP, single nucleotide polymorphism.

¹ DRD4: 11 = any < 4; 12 = 4/4; 22 = any > 4.

² DRD5: 11 = 148/148; 12 = het; 22 = non 148/non 148.

³ DAT1: 11 = non 10/non 10; 12 = 10/non 10; 22 = 10/10.

⁴ HTT: 11 = SS; 12 = SL; 22 = LL.

⁵ HTR1DA, TDO2 since there were only 2 22s, they were combined with the 12s.

⁶ ADRA2C: 11 = < 183/< 183; 12 = het; 22 = 183/183.

ANOVA of ADHD score for the Genotypes of Twenty Genes

Gene	11		12		22		22		F-ratio	p	Gene
	%	Mean	S.D.	%	Mean	S.D.	%	Mean	S.D.		Score
<u>Other Neurotransmitter Genes</u>											
<i>HTR6</i> SNP (Shinkai et al. 1998)											
ADHD	2.8	12.33	9.7	27.1	18.26	10.3	70.0	18.66	11.2	1.44	.23 012
ODD		3.0	2.3		3.91	3.1		3.64	3.2	.44	.64 021
CD		2.11	1.5		3.65	2.6		3.17	2.6	2.05	.13 022
<i>GABRB3</i> dinucleotide repeat (Mutirangura et al. 1992) ^a											
ADHD	38.0	18.99	10.8	47.9	17.48	11.1	14.1	19.69	10.9	1.05	.35 102
ODD		3.57	3.1		3.55	3.2		4.47	3.1	1.67	.18 002
CD		3.01	2.2		2.97	2.4		2.91	2.4	.089	.91 200
<i>GABBR1</i> dinucleotide repeat (unpublished) ^b											
ADHD	9.5	17.5	11.7	27.0	19.1	11.7	63.5	18.2	10.5	.28	.752 020
ODD		3.54	3.7		3.66	3.1		3.72	3.1	.047	.953 012
CD		3.45	2.6		2.72	2.2		3.02	2.4	1.24	.291 201
<i>CNR1</i> (Cannabinoid 1 receptor) (Dawson 1995) ^c											
ADHD	10.6	19.35	10.9	44.7	18.25	11.0	44.7	18.13	10.9	.174	.83 200
ODD		4.67	3.1		3.54	3.1		3.56	3.2	1.89	.15 200
CD		3.09	2.2		2.90	2.3		3.03	2.4	.146	.86 202
<i>CHRNA4</i> (Cholinergic, nicotinic, alpha 4) (Weiland, Steinlein 1996) ^d											
ADHD	8.0	22.19	9.2	36.2	18.90	10.8	55.8	17.19	11.2	2.35	.096 210
ODD		5.07	3.0		3.59	3.0		3.55	3.2	2.74	.065 200
CD		3.11	2.1		2.93	2.3		2.99	2.4	.071	.930 200

Figure 1(b)

Figure 1(b)
(Continued)

MME (enkephalinase) (see Methods)^f.

ADHD	33.9	19.44	11.0	50.9	17.34	10.9	15.2	19.53	10.9	1.26	.284	202
ODD		3.98	3.25		3.44	3.1		3.95	3.0	1.00	.369	202
CD		3.10	2.4		2.81	2.3		3.32	2.4	1.08	.340	202

ANPEP (aminopeptidase N) (Watt, Willard 1990) and see Methods, A 257 G

ADHD	27.7	19.25	10.7	51.6	18.37	10.9	20.8	17.60	11.4	.398	.672	210
ODD		3.65	3.1		3.95	3.1		3.30	3.2	.945	.389	120
CD		3.12	2.4		3.05	2.4		2.42	2.0	1.96	.142	210

NAT1 (N-acetyl transferase) T 1088 A (Dietz et al. 1997; Comings et al. 2000)

ADHD	5.7	21.50	9.5	34.7	19.00	11.2	59.6	17.86	10.8	1.11	.329	210
ODD		4.94	3.7		3.51	3.2		3.68	3.1	1.58	.207	200
CD		4.11	2.8		3.00	2.3		2.88	2.2	2.26	.106	210

Hormones and neuropeptides

ESR1 (estrogen 1 receptor) dinucleotide repeat (del Senno et al. 1992; Comings et al. 1999).

ADHD	27.3	19.08	12.0	41.2	17.52	10.6	31.5	18.90	10.3	.673	.511	201
ODD		3.82	3.4		3.56	3.0		3.86	3.0	.293	.746	202
CD		3.26	2.6		2.53*	2.0		3.33	2.5	4.09	.017	202

CYP19 (aromatase cytochrome P-450) dinucleotide repeat (Polymeropoulos et al. 1991b)^g

ADHD	13.4	16.88	11.6	45.2	17.28	11.7	41.4	19.76	9.9	2.11	.122	012
ODD		3.50	3.1		3.33	3.0		4.11	3.3	2.16	.116	102
CD		3.07	2.4		2.52*	2.2		3.37	2.4	4.61	.011	102

Figure 1(b)
(Continued)

SHBP (sex hormone binding protein) (Xu, Li 1998)

ADHD	59.8	18.39	11.2	35.2	18.38	10.4	5.0	17.44	11.4	.057	.944	220
ODD		3.61	3.1		3.76	3.1		3.50	3.1	.108	.897	120
CD		2.85	2.3		3.11	2.3		3.06	1.8	.465	.628	021

CRH (corticosteroid releasing hormone) (*Xmn* I, Genome Database)

ADHD	89.8	18.25	11.1	8.6	18.78	8.8	1.5	25.00	7.9	1.189	.285	012
ODD		3.66	3.2		3.71	2.8		5.60	3.2	.972	.380	012
CD		2.96	2.4		3.10	2.1		3.80	3.3	.370	.691	012

OXR (oxytocin receptor) (Liao et al. 1996) silent C->T in exon 3

ADHD	47.1	18.48	10.5	44.3	18.0	11.5	8.7	20.11	10.7	.431	.650	102
ODD		3.59	3.1		3.65	3.2		4.39	2.8	.776	.461	012
CD		2.77	2.3		3.14	2.3		3.14	2.4	1.06	.347	022

CCK C-45 T (Ishiguro et al. 1999)

ADHD	77.0	18.57	10.8	20.4	17.66	11.0	2.2	19.71	14.3	.227	.797	102
ODD		3.83	3.2		3.30	2.9		3.00	3.0	.909	.404	210
CD		3.04	2.4		2.71	2.2		3.14	2.3	.555	.574	102

INS (Hoban, Kelsey 1991; Gade-Andavolu et al. 1999)

ADHD	58.6	18.04	10.8	36.7	18.47	11.1	4.7	19.46	11.2	.147	.863	012
ODD		3.68	3.2		3.70	3.1		3.66	3.6	.0014	.998	120
CD		2.95	2.3		2.98	2.4		3.47	1.6	.334	.716	002

CD8 (Polymeropoulos et al. 1991a)^h

ADHD	23.2	17.5	11.3	44.3	18.54	10.9	32.5	18.42	10.9	.122	.885	021
ODD		3.31	3.2		4.09	3.2		3.44	3.0	1.95	.143	021
CD		2.53	2.1		3.27	2.5		2.92	2.1	2.44	.088	021

Figure 1(b)
(Continued)

INFG (Wu,Comings 1998)

ADHD	21.8	18.22	10.9	58.3	18.17	10.9	27.9	18.82	10.8	.109	.896	102
ODD		3.78	2.97		3.69	3.2		3.60	3.2	.068	.934	210
CD		3.11	2.4		3.01	2.4		2.82	2.0	.333	.717	210

PSI (Scott et al. 1996)

ADHD	36.0	17.78	11.1	48.0	18.56	10.6	15.2	18.19	11.6	.215	.806	021
ODD		3.44	3.3		3.92	3.1		3.57	3.1	.828	.438	021
CD		2.59	2.1		3.18	2.4		3.30	2.5	2.68	.069	012

* Significantly lower than highest value by tukey test at $\alpha = .05$.

^a 11 = <188/<188, 12 = het. 22 = =188/=188

^b 11 = =10/=10, 12 = het. 22 = >10/>10

^c 11 = <5/<5 12 = het. 22 = =5/=5

^d 11 = =131/=131 12 = het. 22 = >131/>131

^e 11 = =178/=178 12 = het. 22 = >178/>178

^f 11 = a-c/a-c 12 = het. 22 = d-g/d-g

^g 11 = <4/<4 12 = het. 22 = =4/=4

^h 11 = 145/145 12 = 145/x 22 = x/x

Figure 1(b)
(Continued)

Final Results for the 42 Genes for the ADHD, ODD and CD traits

Trait	r	r ²	adjusted r ²	F	p	# genes
ADHD	.466	.217	.16	3.82	<.0001	22
ODD	.443	.196	.14	3.58	<.0001	20
CD	.451	.203	.15	3.94	<.0001	19

Figure 2

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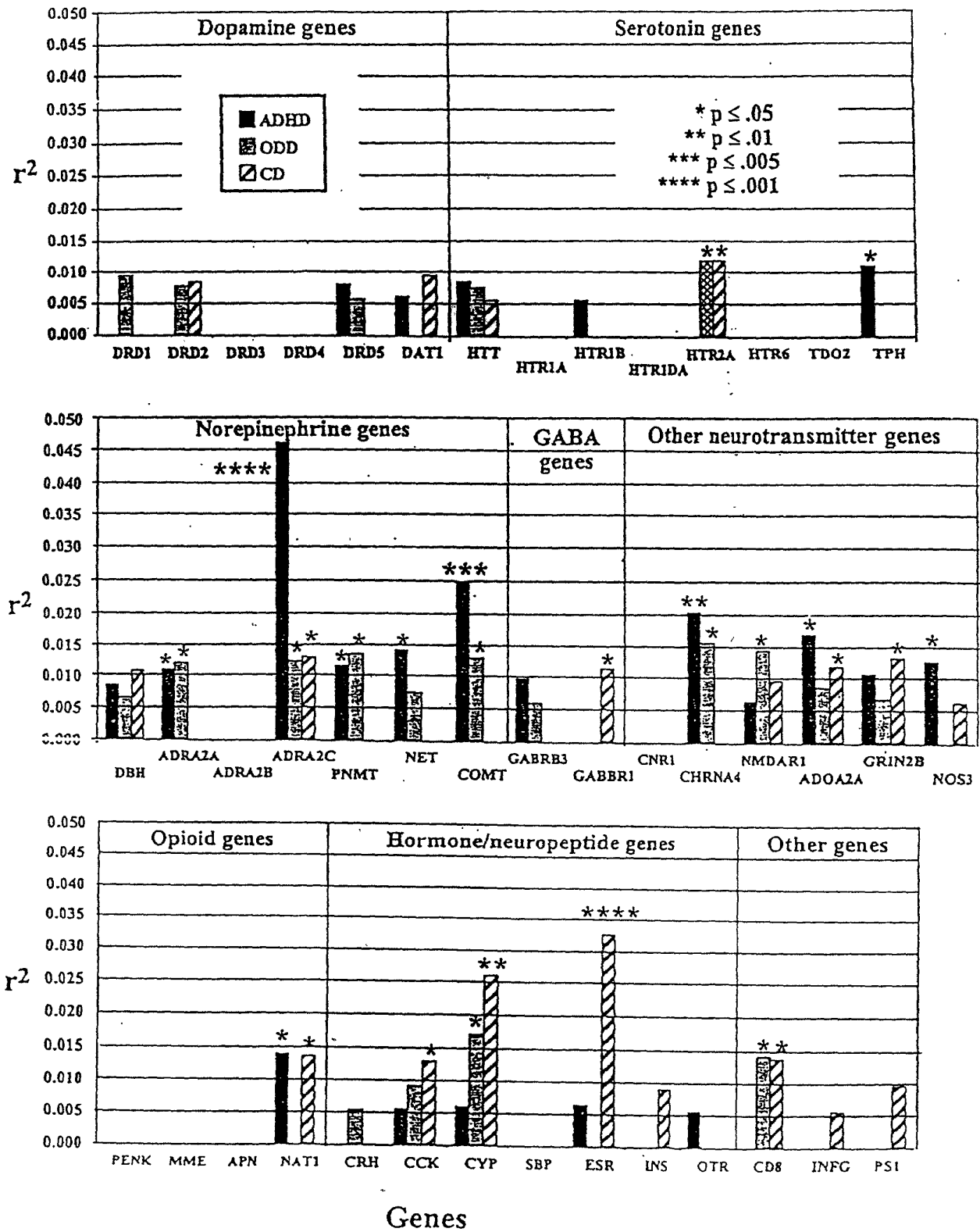


Figure 3

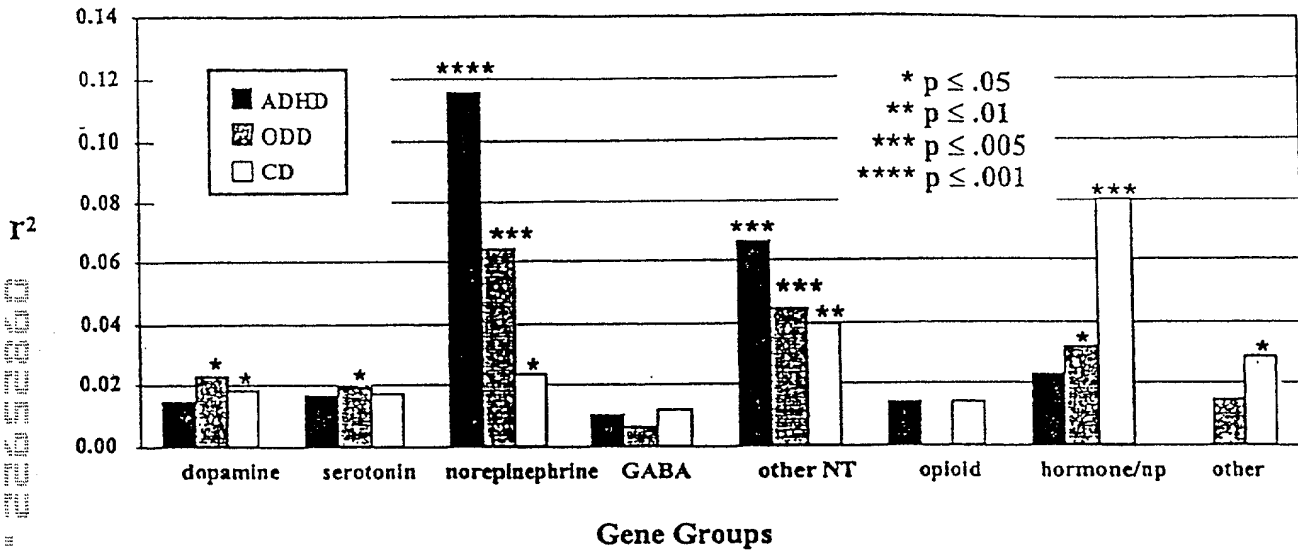


FIGURE 4